

Figure 1

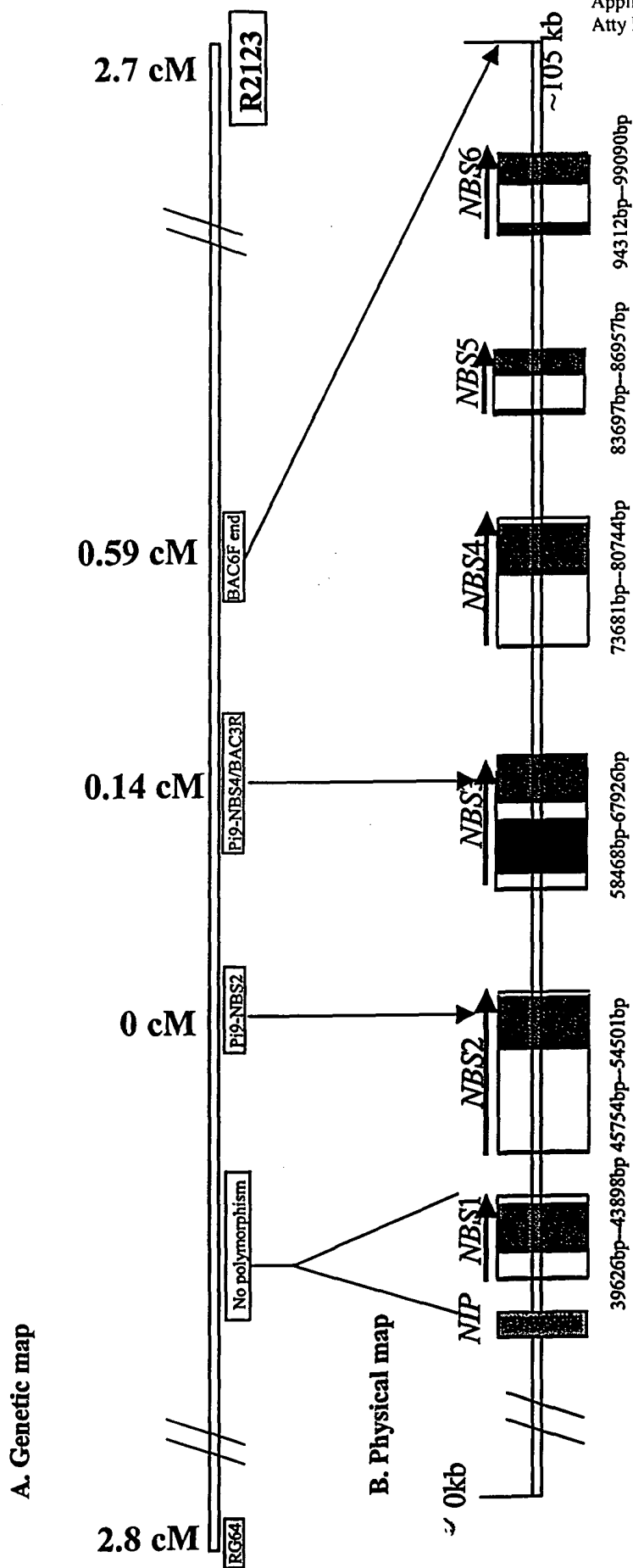


Figure 2

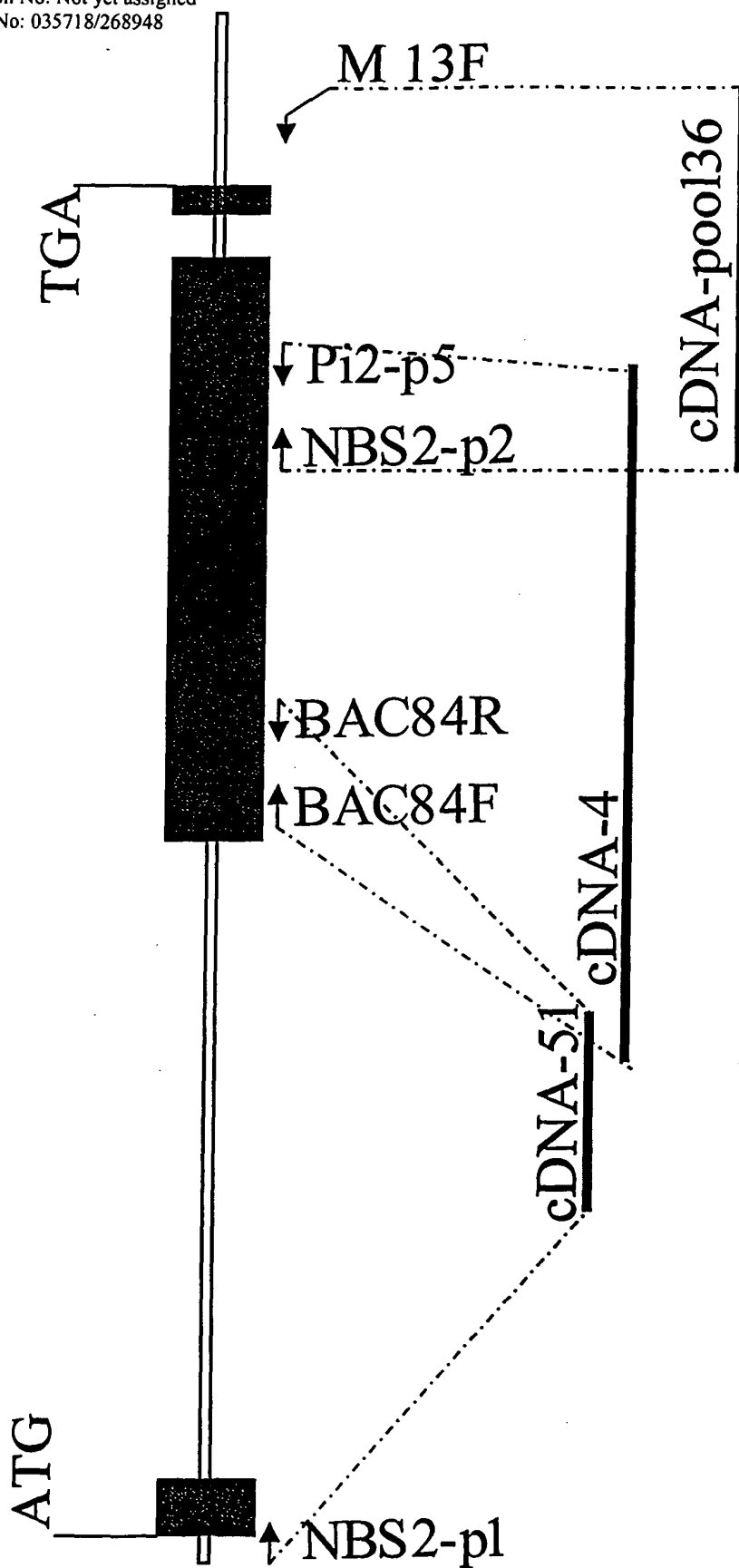


Figure 3

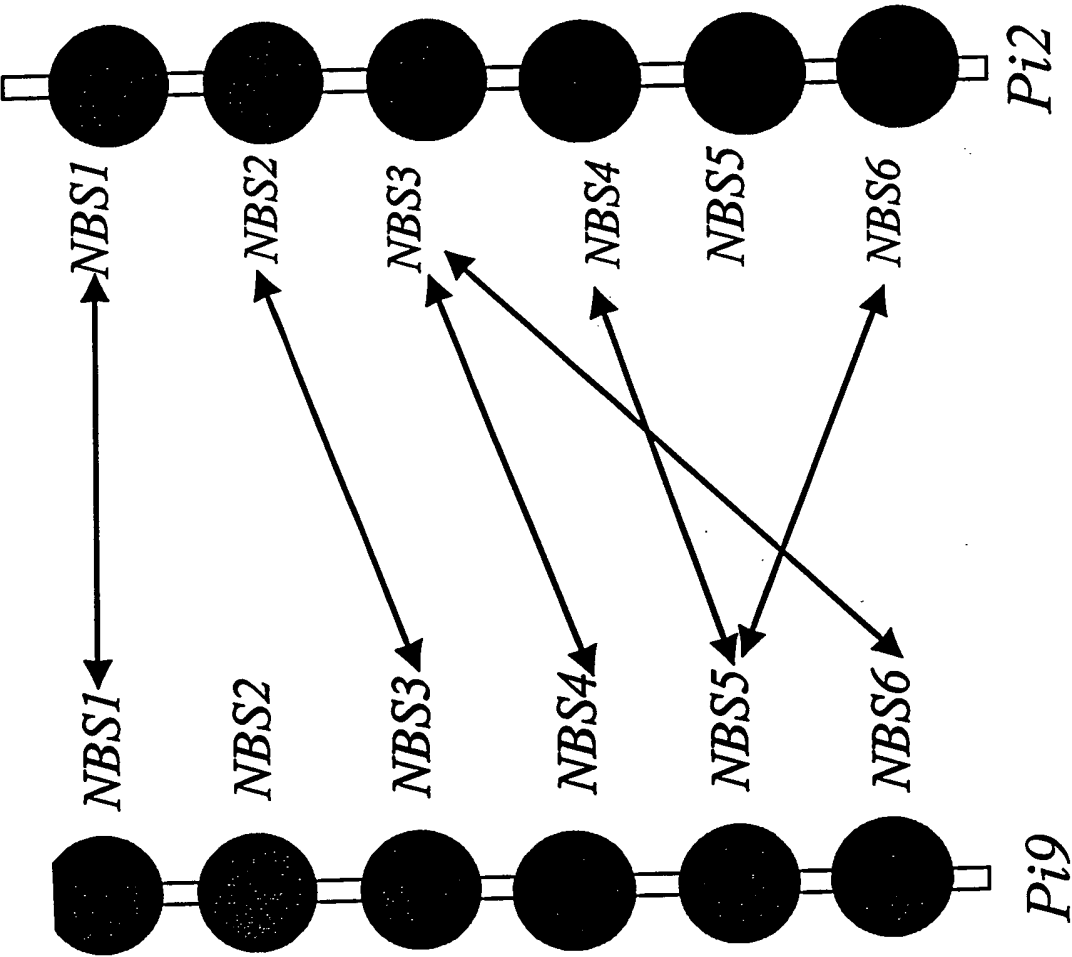


Figure 4

Title: CLONING AND CHARACTERIZATION OF THE  
BROAD-SPECTRUM RESISTANCE GENE P12

Inventor(s): Wang

Application No: Not yet assigned

Atty Dkt No: 035718/268948

Multiple sequence alignment of NBS1, 2, 4, 6 with Cloned blast resistance gene  
Pib

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NBS2      -----
NBS4      -----
NBS6      -----
NBS1      -----
Pib       MMRSFMMEAHEEQDNSKVVKTWVKQVRDTAYDVEDSLQDFAVHLKRPSWWRFPRTLLEHR

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NBS2      -----MAETVLSMARSLVGS AISKAASAAA
NBS4      -----MAETVLSMARSLVGS AISKAASAAA
NBS6      -----MAETVLSMARSLVGS AISKAASAAA
NBS1      -----MAAETVVSMAVSVLGS AVGKAASAAA
Pib       RVAKQMKELRNKVEDVSQRNVRYHLIKGSAKATINSTEQSSVIATAIFGIDDARRAAKQD
              : *      : *      : *      : *      :

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NBS2      NETSLLLGVEKD-----
NBS4      DETSLLLGVEKD-----
NBS6      DETSLLLGVEKD-----
NBS1      DEATLLLG IQKE-----
Pib       NQRVDLVQLINSEDDQLKVIWGTSGDMGQTTIIRMAYENPDVQIRFPCRAWVRVMHPF
              : :      * : : :

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NBS2      -----IWYIKDELKTMQAF LRAAEXMKKKDELLKVWAEQIRDL-----SYDIEDS
NBS4      -----IWYIKDELKTMQAF LRAAELMKKKDELLKVWAEQIRDL-----SYDIEDS
NBS6      -----IWYL-----SYDIEDS
NBS1      -----IWYIKDELKTIQAF LRAAEVTKKKDDLLKVWAEQVRDL-----SYNIEDC
Pib       SPRDFVQSLVNQLHATQGV EALLEKEKTEQDLAKKFNGCVNDRKCLIVLNDLSTIEWDQ
              : : : : : : : : : : : : : :

```

```

NBS2      LDEFKVHIESQTLFRQLVKLRERHRIAIRIHNLSRV EEVSSRNTRYNLVEPISSG-TED
NBS4      LDEFKVHIESQTLFRQLVKLRERHRIAIRIHNLSRV EEVSSRNTRYSLVKPISSG-TEI
NBS6      -----FRHGVGRSNGGPVVMVASGNQ-----SCL
NBS1      LDEFKVHVESQSLAKQLMKLGERHRIAVQIRNLSRIEEVSNRNTYSLIKPISSITTED
Pib       IKKCFQKCRKGSRIIVSSTQVEVASLCAGQESQASELKQLSADQTLYAFYDKGSGIIEDS
              . .      : :      . .      . .      : :      : :

```

```

NBS2      DMDSYAEDIRNQSARN-----VDEAELVGF
NBS4      DMDSYAEDIRNQSARN-----VDEAELVGF
NBS6      AIDSYAEDIRNQSARN-----VDEAELVGF
NBS1      ERDSYLEDARNRSGSN-----TDESELVGF
Pib       VKPVSISDVAITSTNNHTVAHGEIIDDQSMDEKKVARKSLTRITSVGASEESQLIGR
              . *      *      *      : * : : :

```

```

NBS2      SDSKKRLLMIDTNANDGPAKVICVVGMGGLGKTALSRKIFESEEDIRKNFPCNAWITVS
NBS4      SDSKKRLLMIDTNANDGPAKVICVVGMGGLGKTALSRKIFESEEDIRKNFPCNAWITVS
NBS6      SDSKKRLLMIDTNANDGPAKVICVVGMGGLGKTALSRKIFESEEDIRKNFPCNAWITVS
NBS1      AKTKDELLKLIDVNTNDGPAKVICVVGMGGLGKTTLARKAYENKEHM-KNFSCCAWITVS
Pib       EKEISEITHLILNDSQ-QVQVISVWGMGGLGKTTLVSGVYQS-PRLSDKFDKYVFTIM
              . . : : *      *      . . : : * * * * * : : : : : : : :

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NBS2      QSFHRIELLKDMIRQLLG PSS-----LDQLLHELQ GKVVVQVHHLSEYLI EELKEKRYFV
NBS4      QSFHRIELLKDMIRQLLG PSS-----LDQLLQELQ GKVVVQVHHLSEYLI EELKEKRYFV
NBS6      QSFHRIELLKDMIRQLLG PSS-----LDQLLQELQ GKVVVQVHHLSEYLI EELKEKRYFV
NBS1      QSFDRKEILKQ MIRQLLGADS-----LDKLLKEFSEKLLVQVQHLADHLVEGLKEKRYFV
Pib       RPFILVELLRSLAEQLHKGS SKKEELLENRVSSKSLASMEDTELTGQ LKRLLEKKSCLI
              : *      * : : : . *      * : : : . .      : :      * :      * : : :

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NBS2      VLDDLWILHDWNWINEIAFPKNKKGSRIVITTRNVDLAEKCATAS-LVYHLDLFLQMNDA

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Figure 5  
(Sheet 1 of 3)

Title: CLONING AND CHARACTERIZATION OF THE  
BROAD-SPECTRUM RESISTANCE GENE P12

Inventor(s): Wang

Application No: Not yet assigned

Atty Dkt No: 035718/268948

NBS4	VLDDLWILHDWNWINEIAFPKNNKKSRIIVITTRNVDLAEKCATAS-LVYHLDLFQMNDA
NBS6	VLDDLWILHDWNWINEIAFPKNNKKSQIVITTNVVDLAEKCATAS-LVYHLDLFQMNDA
NBS1	VLDDLWTIDAWNWIHDIAFPKINNRGSRIITTRDAGLAGRCTSES-LIYHLEPLHIDDA
Pib	VLDDFSDTSEWDQIKPTLFP-LLEKTSRIIVTTRKENIANHCSGKNGNVHNLKVLKHND
	****: * : * : * : * : * : * : * : * : * : * : * : * : * : * : *
NBS2	ISLLLRKTNKNHEDME--SNKNMQKMVERIVNKCGRPLAILTIGAVLAT--KQVSEWEK
NBS4	ITLLLRKTNKNHEDME--SNKNMQKMVERIVNKCGRPLAILTIGAVLAT--KQVSEWEK
NBS6	ITLLLRKTNKNHEDME--SNKNMQKMVERIVNKCGRPLAILTIGAVLAT--KQVSEWEK
NBS1	IHLLLAKTNIRLEDME--NDEDLSIVTKLVKRCGYLPLAILTIGGILAT--KKIMEWGK
Pib	LCLLSEKVFEATYLDQNNPELVKEAKQILKKCDGLPLAIVVIGGFLANRPKTPPEWRK
	: * * * . : : : : : : : : : : : : * : * * * *
NBS2	FYEQLPSELEINPSLEALRRMVTLGYNHLPShLKPCFLYLSIFPEDFEIQNRNLVGRWIA
NBS4	FYEHLPSLEINPSLEALRRMVTLGYNHLPShLKPCFLYLSIFPEDFEIKNRNLVGRWIA
NBS6	FYEHLPSLEINPSLEALRRMVTLGYNHLPShLKPCFLYLSIFPEDFEIKNRNLVGRWIA
NBS1	FYRELPSLESNPSLEAMRRMVTLSYNHLPShLKPCFLYLSIFPEDFEIQGRNLVDRWIA
Pib	LNENINAELEMNPELGMIRTVLEKSYDGLPYHLKSCFLYLSIFPEDQIISRRRLVHRWAA
	: . . : * * * * . * : * : : . * : * * * . * * * * * * * * * * *
NBS2	EGFVRPKVGMTTKDVGESYFNELINRSMIQRSRVGTAG--KIKTCRIHDIIRDITVSISR
NBS4	EGFVRPKVGMTTKDVGESYFNELINRSMIQRSRVGIAG--KIKTCRIHDIIRDITVSISR
NBS6	EGFVRPKVGMTTKDVGESYFNELINRSMIQRSRVGIAG--KIKTCRIHDIIRDITVSISR
NBS1	EGFVRATDGVNIEDVGNSHFNELINRSLIQPSKVSTDG--VVKRCRIHDIRDIIVSISR
Pib	EGYSTAAHGKSAIEIANGYFMELNKNSMILPFQSGSSRSKSIDSCVHDLMRDIAISKST
	** : . * . : : : : * * * * : . . : . * : * * * : * *
NBS2	QENFVLLPMGDGSDLVQENTRHIAFHGSMSCKTG-----LDWSIIRSLAIFGDRPKSLAH
NBS4	QENFVLLPMGDGSDLVQENTRHIAFHGSMSCKTG-----LDWSIIRSLAIFGDRPKSLAH
NBS6	QENFVLLPMGDGSDLVQENTRHIAFHGSMSCKTG-----LDWSIIRSLAIFGDRPKSLAH
NBS1	EENFVLLTREKITVVAEESIRHLAFHGSKCSKIC-----LEWNHLRSVTLFGDRPVGRTP
Pib	EENLVFRVEEGCSAYIHGAIRHLAISSNWKGDKSEFEGIVDLSRIRSLSLFG-----DWKP
	: * * : : : * : * * : : : : : : : : : : * : * * * * . . .
NBS2	AVCPDQLRMLRVLDLEDVTFITQKDFDRIALLCHLKYSIGYSSSIYSLPRSIGKLQGL
NBS4	AVCPDQLRMLRVLDLEDVTFITQKDFDRIALLCHLKYSIGYSSSIYSLPRSIGKLQGL
NBS6	AVCPDQLRMLRVLDLEDVTFITQKDFDRIALLCHLKYSIGYSSSIYSLPRSIGKLQGL
NBS1	ALCSPQFRMLRVLDLEDKAFKFTQNDIRNIGLLRHMKYLNFASTIYTLPRSIGKLQCL
Pib	FFVYGKMRFIRVLDPEFTRG-LEYHLDQIWKLNLKFLSLRGCYRIDLLPDLLGNLRQL
	. : : : * * * : * . : : : * * * : * : . * * * : * : * *
NBS2	QTLNMSSTYIAALPSEISKQLCLHTLRCIREL-----EFDNFSLN-HPMKCITNTICLPK
NBS4	QTLNMPSTYIAALPSEISKQLCLHTLRCIGQF-----HYDNFSLN-HPMKCITNTICLPK
NBS6	QTLNMPSTYIAALPSEISKQLCLHTLRCRKPF-----VSDNFSLN-HPMKCITNTICLPK
NBS1	QILNMREANISALTTEVTKLQNLRLRCSRRS-----GSGYFSIIDNPKECLMITMCLPM
Pib	QMLDIRGTYVKALPKTIKLOKQYIHAGRKTDYVWEEKHSLMQRCRKVCICATCCLPL
	* * : : : * * . : * * * : * : . : . : * : * * *
NBS2	VFTPLVSRDNRKQIAEFHMAKSFWS-----ESFGVKVPKGIGKLRDLQVLEYVDIR
NBS4	VFTPLVSRDDRAKQIAELHMAKSCWS-----ESIGVKVPKGIGKLRDLQVLEYVDIR
NBS6	VFTPLVSRDDRAKQIAELHMAKSCWY-----KSFVKVPKGIGKLRDLQVLEYVDIR
NBS1	VFLTINFSRDKLIPEICMSCSTRWS-----DTKGVVRVPRGIDNLKELQILEVVDIN
Pib	LCEMYGPLHKALARDAWTFACCVKFPSPIMTGVHEEEGAMVPSGIRKLKDLHTLRNINVG
	: . . : : : : . * * * * : * : : * . : : *
NBS2	RTSSRAIKELGQLSKLRKLAVITKGSTKEKCKILYAAIEKLSSLQSLYMNAALLSDIETL
NBS4	RTSSRAIKELGQLSKLRKLGVTTNGSTKEKCKILYAAIEKLSSLQSLHVAAGISDGGTL
NBS6	RTSSRAIKELGQLSKLRKLGVMTNGSTKEKCKILCAAIEKLSSLQSLYVNAAGISDGGTL
NBS1	RTSRKAIEELGELIQLRKLSTTKGATNKYQIFCAAIEKLSSLQSLRVDAEGFSDTGTL
Pib	RGN-AILRDIGMLTGLHKLGVAG--INKKNGRAFLAISNLNKLESLSVSSAGMP--GLC
	* . : : : * * * : * * . . : : : : * : * * * : * : : . .

Figure 5  
(Sheet 2 of 3)

Title: CLONING AND CHARACTERIZATION OF THE  
BROAD-SPECTRUM RESISTANCE GENE PI2

Inventor(s): Wang

Application No: Not yet assigned

Atty Dkt No: 035718/268948

NBS2	ECLDSISSPPPLLRLTLGLNGSLEEMPNIWIEQLTHLKKFNLWSSKLKE-GKNMLILGALP-
NBS4	ECLDSISSPPPLLRLTLVLDGILEEMPNIWIEQLTHLKKIYLLRSKLKE-GKTMLILGALP-
NBS6	ECLDSISSPPPLLRLTLVLYGSLEEMPNIWIEQLTHLKKIYLLRSKLKE-GKTMLILGALP-
NBS1	EWLNSIACPPPFLLKRLKLNGLADTPNWFGNLKQLVKMCLSRCGLKD-GKTMEILGALP-
pib	GCLDDISSPPENLQSLKLYGSLKTLPEWIKELQHLVKLKLVSRLLEHVDVAMEFLGELPK *:.:.*. * : * * * * *: * : * : * * : * : * : * * *
NBS2	-NLMFLSLYHNSYLGEKLVFKTGAFPNLRLTLVIFNLDQLREIRFEDGSSPQLEKIEIS-C
NBS4	-NLMVLHLYRNAYLGEKLVFKTGAFPNLRLTLWIYELDQLREIRFEDGSSPQLEKIEIG-E
NBS6	-NLMVLDLYRKAYLGEKLVFKTGAFPNLRLTLVIYDLDQLREIRFEDGSSPQLEKIEIR-F
NBS1	-NLMVLRLYRNAYADEKMTFRRTGTFPNLRLCLDIYLLKQLREIRFEEGTSPMTESIEIY-G
pib	VEILVISPFKSEEIHFPPQTGTAFVSLRVLKLKLAGLWGIKSVKFEETMPKLERLQVQGR ::: : : * : * * * : * : : : * : * : *
NBS2	CRLESGIIGIIHLPRLKEISLEYKSKVARLGQLKGEVNTHPNRPVLRMDSDRRDHDLGAE
NBS4	CRLESGITGIIHLPLKKEIPRYGSKVAGLGQLEGEVNAHPNRPVLLMYSDRRYHDLGAE
NBS6	CRLESGIIGIIHLPRLKEISLGYESKVAGLAQLEGEVTRHPNHPVLRKREDRSDHDLACD
NBS1	CRLESGIIGIKHLPRLKIIISLEYDGKVAKLQVLEEVNTHPNHTELQMAEDRSHHDLGGL
pib	IENEIGFSGLEFLQININEVQLSVWFPTDHDRIARAARAAGADYETAWEEEVQEARRKQGGEL . * *: * : . * : : : . . . . : . : .
NBS2	AEGSSIEVQTADPVPDAQGSVTVAVEATDP-----LPEQEGES-----
NBS4	AEGSSIEVQTADPVPDAEGSVTVAVEATDP-----LPEQEGES-----
NBS6	AEGSPVEVEATDPLPEQEGESSQRRDKHSSSWFYQVMISSSIGISGRPCFCGCAHLAVPR
NBS1	ASDG-----DDAHNPALRYQTSC-----
pib	KRKIR-----EQLARNPNQPIIT----- :
NBS2	--SQSQVITLTTNDSEEIGTAQAG-----
NBS4	--SQSQVITLTTNDSEEIGTAQAG-----
NBS6	RGADLRRPLPLSSIASHALDSSLSGMNCFNLTFSRDMLLVPA
NBS1	-----
pib	-----

**Figure 5**  
(Sheet 3 of 3)

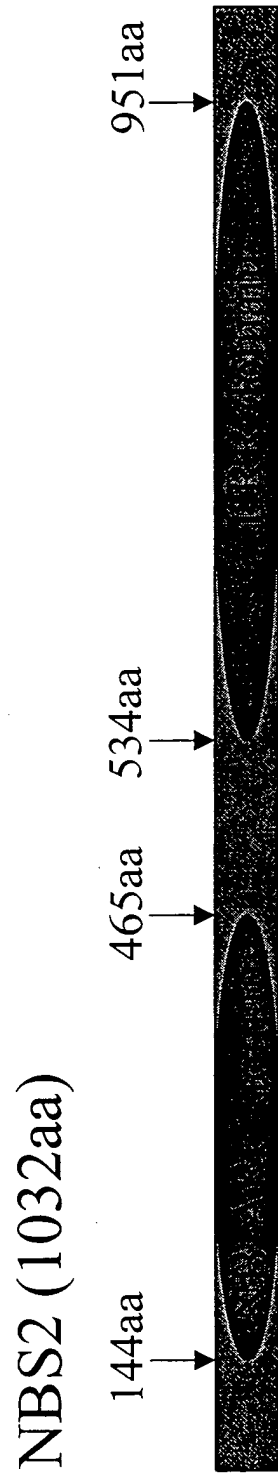


Figure 6